Opportunities and challenges

After saying bon voyage to III-Vs Review's outgoing Editor, Simon Pickering, on his return to Australia, it is with great relish that I take up the mantel as Editor at a time of such vitality in the compound semiconductor industry.

For myself, it is something of a homecoming. Over the last five years - working on a magazine focused on silicon chip manufacturing - I've had the experience of seeing the mainstream semiconductor industry go through one of its greatest boom periods followed by the worst cyclical downturn in its history, before the current post-PC-centric recovery. But prior to this (at the end of the 80s) I was involved in III-Vs research at a stage that can now be seen (compared to the evolution of the silicon industry) as the embryonic stages of what is fast becoming an equally consumer-driven technology.

It is true that - through ever more ingenious IC design and manufacturing techniques - silicon's capabilities are repeatedly extended, for example challenging GaAs for GHz-frequency RF mobile telecoms. But, much as rising microprocessor speeds create demand for yet greater capabilities, the increasing pervasiveness of semiconductors as a whole is creating volume demand for higher-performance compound semiconductor devices. Indeed, rather than a challenge to conventional niche markets, the increasing penetration of semiconductors into products such as mobile phones is opening up new opportunities for compound semiconductors such as RF ICs to a wider consumer market. For example, satellite navigation and collision avoidance radar will soon be in many vehicles, while the explosion in Internet data traffic (and its migration from PCs to hand-held appliances) is driving demand for high-bandwidth fibre-optic communications networks and optoelectronic components.

Apart from increased market demand, the compound industry can also draw on an existing manufacturing experience as technologies converge. For example, GaAs is now following the silicon economic learning curve by transitioning to 6" wafers, while the development of epi compound technologies like SiGe creates cross-over, not only between manufacturers but also suppliers.

The benefits for compound IC manufacturers are economies of scale, with equipment suppliers looking to safeguard themselves from the next downturn in the silicon cycle forecast for 2003 by diversifying into the compound industry. However, as with all maturing industries, while the market opportunity grows, so does the size of the competition. Time, then, for the compound industry to step up to the challenge of expanding market opportunities.

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